United Nations A/AC.105/L.295

General Assembly

Distr.: Limited
15 April 2015
English
Original: English/Russian

Committee on the Peaceful Uses of Outer Space
Fifty-eighth session
Vienna, 10-19 June 2015

Considerations regarding the modalities for consolidating understanding on issues of enhancing the practice in the registration of space objects in view of the need to ensure the safety of space operations

Working paper submitted by the Russian Federation*

1. This working paper has been prepared with due appreciation for, and without prejudice to, the outcomes of the comprehensive review and analysis of the practice of States and international organizations in registering space objects undertaken and successfully completed in 2007 by the relevant Working Group of the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space. It should not be regarded as retrospection or a reproduction of previous deliberations on seemingly resolved issues; rather, it is an invitation to discuss delicately, but consistently, the problems hampering the implementation of ideas on better regulation in the area of registration and develop a functional approach to eliminating those problems.

2. Work on the concept of, and guidelines for, ensuring the long-term sustainability of outer space activities highlights the issue of determining ways and means of making the situation in the near-Earth orbit significantly more predictable and opens up new opportunities for dialogue on various aspects of registration. In this regard, the range of issues that would have to be resolved is wide. In principle, many of those issues are directly related to raising the level and quality of mutual informational awareness of objects and events in near-Earth outer space. In this context, the topic of increasing the efficiency of the implementation of the 1975 Convention on Registration of Objects Launched into Outer Space continues to be significant. Having prioritized this issue by means of such a high-profile event

* The text of the present document was first made available, in English and Russian, as a conference room paper at the fifty-second session of the Scientific and Technical Subcommittee (A/AC.105/C.1/2015/CRP.23).

V.15-02394 (E)

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as the adoption of its resolution 62/101 on 17 December 2007, the United Nations General Assembly has taken sufficient action to formulate the task of enhancing registration practice and encourage States to combine their efforts to ensure the accomplishment of this task.

3. Although consensus on the feasibility and advisability of enhancing registration practice has been formalized, the modalities for achieving this goal evidently also need to be specified. In fact, the lack of a well-designed mechanism for implementing the General Assembly recommendations partly explains why the transition to the use of expanded-format notifications on launched space objects is largely held in abeyance. There is a need for a clear and commonly shared understanding of the best way to transform the task set by the General Assembly into a successful and widely supported practice. Meanwhile, some national practices do not appear to adequately reflect the convention-established requirements imposed on States to register objects under their jurisdiction and control in an appropriate manner, and may even conflict with such requirements. Given the continuing practice of non-registration (notably, cases of intentional non-registration that attract particular attention) and the persistence of selective and arbitrary (even from the standpoint of criteria designed by the Registration Convention) approaches to the format (volume) of the information provided, it would hardly be possible to expect decisions on following essentially new and higher standards to be widely and readily accepted by States.

4. Given the prospects for furnishing expanded information on space objects on an exclusively voluntary basis and without amending the Registration Convention, States are facing the task of harmonizing new information provision requirements with their interests in outer space in a manner that each State understands and formulates in its own way. These interests represent an even more significant factor in defining national practices in registering space objects than is usually assumed.

5. The recommendations of the United Nations General Assembly are evidently based on the assumption that all space objects that are launched are subject to registration; they do not therefore specifically aim to prevent cases of non-registration of such objects. However, it is possible to trace cases where registration information on successfully launched space objects is either totally non-existent (although the launch may be covered by the media) or presented in a very limited scope which has no practical application and/or does not comply with article IV of the Registration Convention. For example, the registration information on a space object launched into the geostationary orbit area may indicate the parameters of a low parking orbit where, according to the flight plan, the object actually spent very little time. Such inadequacies and discrepancies could hardly be attributed to mere lack of foresight. Some countries deem it possible not to provide the United Nations with information on the basic parameters of the final injection orbit which would, in fact, make it possible to ascertain the part of outer space where the object is located. It is evident that the real reasons for allowing such practices are associated with the way some countries specifically understand their own interests in the sphere of national security. Through non-registration and/or the incomplete furnishing of the data required for proper registration of space objects (for example, without specifying orbit parameters), space objects are actually divested of any attributes and characteristics that could allow their identity and the precise way they got into the orbit to be established. This makes it possible to achieve quite definite objectives

conditioned by corresponding political goals. Whatever explanation may seem tenable, credible and preferable in situations like those described above, it is evident that such practice seriously restricts information on objects and events in near-Earth space from the point of view of completeness, accuracy and reliability and, consequently, creates risks of contingencies and compromises security in outer space. A situation where undeclared or inadequately declared space objects may potentially cause incidents and conflicts or even serve to advance confrontational anticipation cannot be ruled out. In particular, for these reasons there can be no credible justification for deliberate evasion of registration.

6. The problem of non-registration calls attention to the issue of how to deal with the spent stages of launch vehicles. It is known that the report of the Secretary-General of the United Nations on the review of the application of the Registration Convention (A/AC.105/382) recognized the practice of non-registration of stages (still followed by the majority of States) as being compliant with that Convention. It can be stated that States were chiefly motivated to refrain from registering stages by the fact that, generally, stages are not themselves functioning space objects. At the same time, it could, in principle, be assumed that such unequivocal assessments do not fully reflect the current state of affairs, as the development of technology has made it possible to utilize spent stages of launch vehicles as platforms for non-detachable payloads continuing to operate long after the stage itself has ceased to function. It should be noted that national regulation of the issue of the registration of stages is changing over time and in a number of cases is marked by dynamics in the sense that States decide to register stages. This may be regarded as a sign, in particular, of an intention to ensure adherence to the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space.

7. So far, there seems to be no full understanding of how to holistically create political preconditions for the application of a single approach that would make it possible to avoid random development and variability of practice in this sphere, and to expand the format of registration. There should be an additional discussion of the modalities for ensuring that States, faced with a choice (because, formally, it is recommendations that are being addressed here), will be able to act in a concerted fashion to achieve the uniform enhancement of national registration practices and making use of their adaptability. Essentially, a mechanism is needed for transforming the recommendations produced into practice of States that is as broad as possible and collective by its very nature. The decision on updating the regulatory system should be translated into a reliable formula allowing States to implement shared standards of behaviour and take concerted actions.

8. Provision of additional information on space objects and the functions they perform, as well as information on the particularities of their orbital motion, may indeed have relevance to the sphere of national security interests. At the same time, provision of information on the orbital location of space objects and its timely use form the basis both for ensuring the general safety of space operations and for the entire system of security of space activity. Accordingly, States should take practical joint action to develop a proper system of priorities.

9. Simultaneous participation by all launching States, and especially those that actually perform launches (and, inter alia, provide launch services), in the improved registration procedure for space objects would be the key to achieving the goals set

by the General Assembly. In this overall context, they should contribute to the debarment of cases of non-registration of space objects. It cannot be ruled out that, under certain political or other circumstances, it might not be possible to guarantee sustained adherence to new practices in this domain. Such practices themselves will turn out to be short-lived unless they are implemented in a sufficiently coherent and effective manner by a considerable number of States, primarily those exercising jurisdiction and/or control over operators (suppliers) of launch services.

10. Analysis of a variety of practical situations arising in the course of conducting activity in outer space reveals problems which affect registration to various extents and are fairly complicated in organizational, technical and legal terms. Regulation of registration (including through implementation of the General Assembly's recommendations set forth in resolution 62/101) is, to a large extent, still tailored to the practice of conducting space activity that was typical of past years and was objectively simpler in organizational and technological terms. The situations that are evolving now are conditioned by the use of essentially new technological solutions, the increasing design complexity of space objects and growing numbers of participants in space activities. Moreover, the increasing impact of commercial profit considerations often leads in practice to situations where launch customers and space object operators are not always requested in sufficiently clear terms to fulfil all the applicable registration requirements. Cases of the transfer of rights and obligations with respect to space objects may also result in overlaps in registration practice. In addition, problems associated with the possible failure of space equipment continue to play a role.

11. Review of the online index of space objects maintained by the Office for Outer Space Affairs of the Secretariat reveals a whole range of decisions on the scheme of registration of space objects adopted at the national level that appear not to have been foreseeable. In a number of cases the State providing launch services assumes the role of the State of registry in respect of the objects it has launched, although jurisdiction and control over these objects are apparently exercised by a different State. This practice does not comply with the requirement stipulated in article VIII of the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. Space objects owned by given private companies carrying out their activity under the legislation of one State are recorded in the Register of Objects Launched into Outer Space on behalf of another State, thus raising questions regarding the rightfulness of such decisions. There are cases where States actually, for no obvious reason, neglect their obligations under the Registration Convention by preferring not to include in their national registries the objects that should be listed there according to all legal criteria. In such situations, the Secretary-General of the United Nations is simply informed of the launch. Such practice has been observed with regard to some launches of satellites of former international organizations for satellite communication that have now become private companies. The system for executing the registration function with respect to situations affecting the territories with special status can be characterized as rather intricate and essentially constituting a "grey zone". General Assembly resolution 68/74 of 11 December 2013, entitled "Recommendations on national legislation relevant to the peaceful exploration and use of outer space", may prove to be useful functionally and from the point of view of promoting more orderly regulation in some of the challenging situations identified above. Serious deliberations would be warranted to identify

practical solutions to prevent the replication of practices that are evidently far from impeccable in legal terms.

12. Efficient registration practice may be achievable within the general regulatory framework expected to be created by the guidelines for the long-term sustainability of outer space activities. The preliminary draft text of the guideline relating to registration is reduced to a reference to General Assembly resolution 62/101 and has no regulatory elements. Nevertheless, it is clear that the final draft of the guideline should be different. Joint work needs to be done to work out the regulatory details and prepare a text with a logical premise and a fixed set of functions

13. General Assembly resolution 62/101 should be treated as a document representing a fairly logical and convincingly elaborated integral whole. However, this does not imply that at the stage of transforming the recommendations contained in this resolution into a new quality of a guideline intended to give a practical dimension to the proposed regulation, it would not be worthwhile reaching, where necessary, additional understanding regarding technical aspects and terminology (including adjustment of the translations in all the official languages of the United Nations), as well as achievement of agreement on implementation procedures.

14. A number of the recommendations made by the General Assembly were prompted by the good intention of ensuring improved record-keeping for objects launched into outer space. To achieve this goal there is a need for a dataset allowing the origin, ownership and location of objects to be clarified and the objects themselves to be classified according to characteristics directly relevant to the process of creating an information basis for ensuring the safety of space operations. Ideas that could facilitate the process of finding effective solutions to technical issues are introduced for consideration in paragraphs 15-19 below.

15. The centralized practice of registering orbital launches is, in fact, no longer functioning. Until July 2011, such registration was carried out by the World Data System of the International Council for Science. Consequently, the Committee on the Peaceful Uses of Outer Space will definitely have to decide on ways and means of resuming centralized practice within a new international platform (for instance, within the framework of the Office for Outer Space Affairs) and in a renewed format (on the basis of direct interaction between States and the Office). If the Office, as may be supposed, were to undertake those functions, all States conducting orbital launches could, by way of contributing to such activities, promptly provide confirmation of the fact of a launch and the origination of any new object in orbit. Such a solution would fully ensure the required centralization of the function of assigning an international designation to orbital launches in accordance with the Committee on Space Research system and would create a practical basis for States to implement the recommendation to include the international designation of space objects in the registration information. The usefulness and functionality of the Russian proposal to establish a unified centre for information on near-Earth space monitoring under the auspices of the United Nations are quite vividly confirmed in this context since an information platform of the kind proposed could provide the framework for implementing the function of record-keeping with regard to launches of space objects on the basis of information provided by States.

16. General Assembly resolution 62/101 contains a fairly extensive list of characteristics pertaining to space objects that are recommended for reporting.

These characteristics have, as regards certain aspects, something in common with the requirements of the Registration Convention or could add new elements to the existing regulatory framework. Some of these elements (indication of location on the geostationary orbit and of any change of orbital position), as well as the orbital parameters indicated in the Convention, will be truly useful in terms of the goals and tasks of ensuring the safety of space operations only if their values are referenced in Coordinated Universal Time. Such a concept, which has not hitherto been used in the registration of space objects, should be reflected in the guidelines for ensuring the long-term sustainability of outer space activities.

17. Regarding a number of aspects, General Assembly resolution 62/101 undoubtedly contains fairly broad recommendations. Nevertheless, working on the issues pertaining to the safety of space operations raises the need to formulate the recommendations in sufficient detail in order to manage such operations efficiently, paying attention to the fact that the equivalence of some terms used in the texts of the above resolution in various official languages of the United Nations is questionable (there are clear discrepancies in the terminology used in the Russian and English versions of the document). For instance, in the resolution, the General Assembly encourages States to consider the possibility of providing information in respect of "any change of status in operations". This recommendation can, quite reasonably, be understood as referring to the advisability of providing information on the changes in the functioning status of a space object and/or information on the changes in the functionality of a space object in general. In this respect, the following possible descriptions for specifying this "status" may be addressed: "operational"/"non-operational"; "is being used for the intended purpose"/"has been transferred to the storage regime"/"is undergoing testing". Moreover, in this same context, it is also possible to presume that what is actually meant is information on any change in the mode of operation of the object (including in modes of attitude control, stabilization and radio link use). So as, firstly, to avoid creating a problem out of objectively existing interpretative issues and, secondly, to avoid prejudicing the objectives of the resolution, it should be explicitly provided for in the guidelines for ensuring the long-term sustainability of outer space activities that, in order to ensure the safety of space operations, States and international intergovernmental organizations, acting in a responsible manner, should to the maximum extent practicable provide information proceeding from the following indicative list of circumstances characterizing the flight of a space object:

- Termination or renewal of operation
- Loss of functionality due to failures or other reasons
- Loss of flight control with simultaneous risk of causing radio frequency interference to other operational space objects and/or risk of dangerous conjunctions with other operational objects
- Separation (if envisaged) for subsatellites and/or technological elements
- Deployment (if envisaged) of elements that significantly change the properties of the space object from the point of view of assessing the time of its ballistic existence (this characteristic is particularly important for small and extremely small space objects that operate on low orbits)

- Transfer of a space object to a disposal orbit or to an orbit with reduced time of ballistic existence

If such a list is reflected in the draft guideline devoted to implementation of the resolution, the Office for Outer Space Affairs would have formal grounds for working out in detail the corresponding section of its Registration Information Submission Form, so as to implement the resolution.

18. The issue of providing information on a space object's capability to perform a dedicated function of change of orbit, which is essential for preventing the collision of objects, needs to be specifically highlighted. The declaration by a State of such a function in a space object under its jurisdiction and control leaves that State to a certain extent vulnerable in the sense that it may serve as a basis for a requirement advanced by another State, based on its own calculations, to change the trajectory of motion in order to avoid collision with the space object of that other State. There is no universal criterion or generally acknowledged procedure for defining, in each particular case, which of the space objects has "priority" and which of the two States has to change the trajectory of its space object. Moreover, it is unlikely that it will be practically possible to elaborate such criteria and procedures in the foreseeable future. A reasonably possible functional solution to this problem could be planned within the framework of the unified centre for information on near-Earth space monitoring. Such a centre would accumulate multi-source ephemeris information describing the trajectory of motion of space objects that is absolutely necessary for quantifying possible risks and establishing the tentative sequence of further steps to be taken (with the understanding that such steps are to be further ascertained in accordance with the recommendations contained in the provisionally agreed draft guideline on conjunction assessment).

19. An issue that remains unregulated is that of registration in two situations that may arise during a launch envisaging the simultaneous placement of several space objects into orbit. The first situation occurs when, because of a malfunction, separation of the objects from the launch vehicle's stage does not actually happen. In such a case, there is a space object in the orbit that is de facto a "conglomerate" of several space objects which may be under the jurisdiction of one or several States. This situation, in turn, engenders the problem of the registration of each of the objects of the "conglomerate". The other situation occurs when, during the launch of several space objects, the separation operation is technologically/operationally "postponed". Within the framework of the analysis of registration practice, it has not been possible to identify the cases of registration of objects actually delivered to the orbit as part of other objects which do not perform independent orbital flights and remain in "standby mode" while awaiting the start of the separation operation. However, in accordance with the recommendation contained in General Assembly resolution 62/101, during every such launch each space object must be registered separately. Being in congruence with the Registration Convention, the resolution leaves open whether the object should be registered only when it performs an independent orbital flight, or whether registration should take place during the phase when it is already in the orbit as part of another object. Launching the objects in the "postponed separation" mode without notification that such separation will subsequently take place may lead to measurable risks for space operations, engendered by an unexpected appearance of new orbital objects. Fundamentally, this problem may be solved by achieving and adequately formalizing the

understanding that, when the corresponding section of the Registration Information Submission Form developed by the Office for Outer Space Affairs in accordance with the resolution is filled out, the names of objects intended for separation must be specifically indicated along with other information.

20. If States take a serious attitude to setting out the recommendations of the General Assembly in the qualitatively new context of a draft guideline, an opportunity will open up to carry out an extra check of the technical content of the key notions that form the basis of the recommendations in the versions of the resolution in all the official languages of the United Nations. The advantage of this approach is that the text of the guideline will be complete in terms of ensuring substantive content and absolute accuracy of terminology.

21. Given the foregoing, the Russian Federation submits (in original Russian and English versions) the following text of the potential guideline as the solution to a variety of topical problems related to the registration of space objects, for the consideration of the Scientific and Technical Subcommittee.

Draft guideline

Consistent enhancement of the practice in registering space objects

States and international intergovernmental organizations, acting in support of the objectives of the Convention on Registration of Objects Launched into Outer Space of 14 January 1975, should, on a continuous basis, take measures to ensure effective and comprehensive implementation of the registration procedure established by the said Convention. In this context, they should also undertake to translate into successful political action, through practical tools and normative regulation, the accomplishment of the tasks of enhancing the practice in registering space objects, as set by the relevant resolutions and recommendations of the United Nations General Assembly, so that the procedures for provision of expanded registration information gain wide international acceptance and are sustained in the long term. States and international intergovernmental organizations should act in this domain in a responsible way, considering proper registration of space objects an important factor of security in outer space, and should accordingly be guided by, and make their policies contingent upon, the following overriding principles and understandings.

It should be conclusively assumed and/or provided for under regulatory instruments enforced by States and international intergovernmental organizations and related to space policies that States and international intergovernmental organizations should not, in any formal or practical way, neglect or unduly perform the procedure of registration, and that non-registration of space objects may have serious negative implications for ensuring the safety of space operations. States and international intergovernmental organizations should discourage non-registration and should not provoke, support or allow any non-registration practices for whatever reason. Solutions should also be sought whenever specific launches of space objects give rise to legal or technical issues that call for diligence in the implementation of registration procedures.

In case it can be maintained plausibly that a space object has not been registered in accordance with the criteria provided for in the Registration Convention and resolutions of the United Nations General Assembly, States and international intergovernmental organizations may direct a request to the State/international intergovernmental organization that presumably abstained from registration to clarify its intentions or officially refute the fact of non-registration. Any assumption of non-registration should be substantiated accordingly. Such requests should be responded to, and the presumed fact of non-registration should be commented on, with a view to clearing up any possible misconceptions and/or resolving concerns. In making appropriate responses, the requested States/international intergovernmental organizations should, when appropriate, provide for the assurance of the absence of ulterior motives and/or specific intent behind a non-registration that actually took place. States and international intergovernmental organizations are obliged to act in such a way as to avoid abuse of the right to direct such requests.

The Office for Outer Space Affairs should, on a continuous basis, be vested with appropriate authority to take action to establish and sustain an implementation mechanism that would enable it to satisfactorily achieve the goal of encouraging and ensuring the adherence of States and international intergovernmental organizations to consolidated practice in furnishing expanded registration information. Specifically, the Office should be effectively engaged in executing integrated functions pertaining to: the accumulation of information on orbital launches performed (i.e. actually completed launches resulting in the placement of objects into Earth orbit or beyond) and orbital objects (i.e. space objects which have actually been launched into Earth orbit or beyond); and the assignment of international designations to orbital launches and orbital objects in accordance with Committee on Space Research notation, as well as the provision of such designations to the States of registry.

The launching States and, where appropriate, international intergovernmental organizations should assume the responsibility for requesting, on legitimate grounds, space launch service providers and users to meet all registration requirements under the Registration Convention, and for encouraging their receptiveness to the feasibility of, and urging them to contemplate, the provision of expanded registration information. States and international intergovernmental organizations, having institutionalized the practice of providing expanded registration information, should strive to sustain such practice. In cases where such practice ceases to correspond to the interests of a State, in particular within the purview of its national security policies, or the interests of an international intergovernmental organization, in particular pertaining to security, such State or international intergovernmental organization should, in an official statement forwarded to the Office for Outer Space Affairs, identify circumstances that make such continued practice impossible.

States and international intergovernmental organizations, acting in a responsible way in the interests of ensuring the safety of space operations, should to the maximum extent possible provide information describing the condition (status) of a space object and changes in orbital location of a space object. Description of the condition (status) of a space object should be provided as correlated with the following indicative list of circumstances of its flight, which is to be considered immediately responsive to the task of ensuring the safety of space operations and

functionally equivalent to the occurrences presumed in paragraph 2 (b) (ii) of General Assembly resolution 62/101:

(a) Termination or renewal of functioning of a space object;

(b) Loss of functionality of a space object due to technical flaws or other reasons;

(c) Loss of ability to control the flight of a space object with simultaneous emergence of the risk of harmful radio frequency interference with radio links of other functioning space objects and/or the risk of potentially hazardous conjunctions with other functioning space objects;

(d) Separation (if envisaged) of subsatellites and/or technological elements of space objects;

(e) Deployment (if envisaged) of the construction elements which purposefully change properties of a space object that influence its orbital lifetime.

States and international intergovernmental organizations, acting in the same manner, should to the maximum extent possible provide the information which is presumed in paragraph 4 (a) (iii) of General Assembly resolution 62/101 and which describes changes in the orbital location of the space object, in accordance with the following indicative list:

(a) Purposeful change of orbital parameters of a space object as a result of which the said space object moves to a different region of near-Earth space;

(b) Placement of a space object into a graveyard orbit or an orbit with reduced ballistic lifetime;

(c) Change in location on geostationary orbit;

(d) Repositioning (not entailing significant changes in basic orbital parameters) of a spacecraft operating as part of a satellite constellation among nominal slots within the orbital structure of this constellation.

In cases where a launched space object contains other space objects planned for future separation and independent orbital flight, States and international intergovernmental organizations should, in the course of registering the main space object (at the stage of entry in their registry and when furnishing registration information to the Secretary-General of the United Nations), indicate (for example, in the form of side notes) the number and names of space objects planned for separation from the main one, with the understanding that those space objects should not be given different or modified names at the stage of subsequent registration.